

Consumer culture keeps carbon emissions high

When governments want to curb greenhouse gas emissions, they focus on the pollution created within their own borders. But that is just part of the story if the goods consumed in one nation are produced in another country. As a step toward a more complete reckoning, a new study published in *ES&T* [DOI 10.1021/es803496a] calculates the carbon footprints of 73 nations by using a trade-linked model of the global economy. The result is that a country such as Switzerland has a carbon footprint nearly twice the size of its domestic greenhouse gas emissions.

Previous research has shown that rich countries can, in essence, outsource their carbon emissions by shifting production to developing countries, says Edgar Hertwich, who is the lead author of the research and an industrial ecologist at the Norwegian University of Science and Technology. The new study advances this approach by revealing the kinds of consumption patterns that generate greenhouse gases.

The study found that national per capita footprints ranged from 1 ton of CO₂ equivalents per year (t CO₂e/y) in African countries to about 30 t CO₂e/y in the U.S. The researchers then broke the carbon footprint down into emissions from eight consumption categories: construction, shelter, clothing, services, food, mobility, manufactured products, and trade. The more a country spends on these items, the more greenhouse gas it emits, Hertwich says. Mobility and manufactured products dominate emissions in rich countries, whereas food accounts for the largest fraction of pollution in poor countries.

"This research helps to prioritize the product categories on which

policy actions can be focused," says Werner Bosmans, an environmental policy officer with the European Commission.

Perversely, Bosmans says, improving technology and boosting the efficiency of production has not reduced carbon emissions. Instead,



Because of an insatiable desire for imported manufactured goods, a rich country's carbon footprint can dwarf its national greenhouse gas emissions inventory.

as goods are produced more efficiently, they become cheaper, leaving consumers with more discretionary cash to buy more stuff, he says. "These views reflect only my personal opinion," he adds.

These consumption and lifestyle issues go undetected by domestic emission inventories, which focus on a technological fix to cutting emissions, says Klaus Hubacek, an environmental scientist at the Sustainability Research Institute at the University of Leeds (U.K.). "The current emission inventories just show where emissions occur, but the consumer-based approach or carbon footprint might help to explain why they occur and provide a better tool for influencing consumption and thus mitigating emissions," he says.

The EU has an ambitious Sustainable Consumption and Production and Sustainable Industrial Policy Action Plan that aims to continuously improve the environmental performance of products throughout their

life cycle and help consumers move toward more sustainable consumption patterns, Bosmans notes.

The Stockholm Environment Institute (SEI), a nonprofit research organization, has argued that international climate policies should include carbon footprint inventories and

tools to push consumers into low-carbon products, says Tommy Wiedmann, an ecological economist with SEI at the University of York (U.K.). This approach will be discussed at the UN's COP15 climate meetings in Copenhagen this December, he says.

Ideally, a global treaty would set targets for the carbon footprint for each nation at a level that would prevent the average global temperature from rising more than 2 °C, Wiedmann explains. "In a far future, we could imagine everybody having a CO₂ quota to spend," adds Bosmans.

Measures to curb or shift consumption could include taxes on carbon-wasting goods and services, Wiedmann says.

But linking greenhouse gas emissions to consumption is a tricky business for politicians, because consumers are also voters, says Ab Stevens, a professor in the Design for Sustainability Lab of the Delft University of Technology (The Netherlands). "Blaming consumers for too much consumption, let alone taxing consumption, as compared to putting all the responsibility for CO₂ with industry and suggesting that technology will bring a solution, is something which will be seen as very risky," he says.

The new study has a message for policy makers, Stevens says: "Be courageous, tell your citizens the unpleasant and inconvenient truth—do not suggest that technology alone will be good enough."

—JANET PELLEY